



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005



Job No.: CTCE/BBMP/W.No.08/AA/QB(BC)/2014-15

15.12.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	Mr. Ashwathnarayana Anjanappa, Contractor, Bangalore.
NAME OF THE WORK	:	Improvements of Roads and drains in 1st cross, Shanthivana in Ward No.08, Kodigehalli Sub Division. (Change of Place: From Kodigehalli Railway Level Crossing to TATA Nagara Main Road Balance), BBMP, Bangalore.
REFERENCE	:	AEE/KSD/PR/ /2014-15 Dated: 01.12.2014
SAMPLE ID	:	Bitumen
DATE OF TESTING	:	15.12.2014



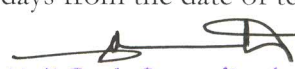
The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	84	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	58	Min. 50
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	276	Min. 220



Note:

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Job No.: CTCE/BBMP/W.No.08/AA/BC/AIV/2014-15

15.12.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ashwathnarayana Anjanappa, Contractor, Bangalore.
Name of the Work	Improvements of Roads and drains in 1st cross, Shanthivana in Ward No.08, Kodigehalli Sub Division. (Change of Place: From Kodigehalli Railway Level Crossing to TATA Nagara Main Road Balance), BBMP, Bangalore.
Reference	AEE/KSD/PR/ /2014-15 Dated: 01.12.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	15.12.2014



Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	382	
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	80	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	300	
4	Aggregate Impact value = percent fines	21.11	21.47	21.29
	$100 * (W_2/W_1)$ percent			

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.08/AA/BC/Shape.T/2014-15

: 15.12.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: Mr. Ashwathnarayana Anjanappa, Contractor, Bangalore.
Name of Work	: Improvements of Roads and drains in 1st cross, Shanthivana in Ward No.08, Kodigehalli Sub Division. (Change of Place: From Kodigehalli Railway Level Crossing to TATA Nagara Main Road Balance), BBMP, Bangalore.
Reference	: AEE/KSD/PR/ /2014-15 Dated: 01.12.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 15.12.2014



Result : Flakiness Index = **11.59%**

Elongation Index = **13.72%**

Result : Combined Flakiness & Elongation index

25.31%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.08/AA/BC/Stripping/2014-15

16.12.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ashwathnarayana Anjanappa, Contractor, Bangalore.
Name of Project	Improvements of Roads and drains in 1st cross, Shanthivana in Ward No.08, Kodigehalli Sub Division. (Change of Place: From Kodigehalli Railway Level Crossing to TATA Nagara Main Road Balance), BBMP, Bangalore.
Reference	AEE/KSD/PR/ /2014-15 Dated: 01.12.2014
Type of Mix	Bituminous Concrete
Date of Testing	16.12.2014



Type of binder : 80/100
Percentage of binder used : 5.00% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.00 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.8	2.93	97.07
2	2.9		
3	3.1		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.08/AA/BC/Sp_Wa/2014-15

16.12.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ashwathnarayana Anjanappa, Contractor, Bangalore.
Name of Project	Improvements of Roads and drains in 1st cross, Shanthivana in Ward No.08, Kodigehalli Sub Division. (Change of Place: From Kodigehalli Railway Level Crossing to TATA Nagara Main Road Balance), BBMP, Bangalore.
Reference	AEE/KSD/PR/ /2014-15 Dated: 01.12.2014
Type of Mix	Bituminous Concrete
Date of Testing	16.12.2014



Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2014	2015	2016	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1259	1260	1261	
4	Weight of saturated surface dry aggregate in air	W_3 g	2030	2033	2032	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s)$ g	771	773	771	
6	Weight of oven dried aggregate	W_4 g	2012	2014	2016	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.610	2.605	2.615	2.610
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.672	2.671	2.670	2.671
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.89%	0.94%	0.79%	0.88%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.08/AA/BC/Agg/2014-15

16.12.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	Mr. Ashwathnarayana Anjanappa, Contractor, Bangalore.
Name of Project	Improvements of Roads and drains in 1st cross, Shanthivana in Ward No.08, Kodigehalli Sub Division. (Change of Place: From Kodigehalli Railway Level Crossing to TATA Nagara Main Road Balance), BBMP, Bangalore.
Reference	AEE/KSD/PR/ /2014-15 Dated: 01.12.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	16.12.2014



Total Weight of Sample: **5450** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	485	8.90	8.90	91.10	79 - 100	
9.5	615	11.28	20.18	79.82	70 - 88	
4.75	785	14.40	34.59	65.41	53 - 71	
2.36	755	13.85	48.44	51.56	42 - 58	
1.18	530	9.72	58.17	41.83	34 - 48	
0.600	625	11.47	69.63	30.37	26 - 38	
0.300	535	9.82	79.45	20.55	18 - 28	
0.150	325	5.96	85.41	14.59	12 - 20	
0.075	430	7.89	93.30	6.70	4 - 10	

Total Weight of Sample: **5475** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	745	13.61	13.61	86.39	79 - 100	
9.5	542	9.90	23.51	76.49	70 - 88	
4.75	725	13.24	36.75	63.25	53 - 71	
2.36	475	8.68	45.42	54.58	42 - 58	
1.18	635	11.60	57.02	42.98	34 - 48	
0.600	575	10.50	67.53	32.47	26 - 38	
0.300	525	9.59	77.11	22.89	18 - 28	
0.150	490	8.95	86.06	13.94	12 - 20	
0.075	385	7.03	93.10	6.90	4 - 10	

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Job No.: CTCE/BBMP/W.No.08/AA/BC/Stability/2014-15

16.12.2014

TEST REPORT ON STABILITY OF MIX

Client	:	Asst. Executive Engineer, Kodigehalli Sub Division, BBMP, Bangalore.
Agency	:	Mr. Ashwathnarayana Anjanappa, Contractor, Bangalore.
Name of the Work	:	Improvements of Roads and drains in 1st cross, Shanthivana in Ward No.08, Kodigehalli Sub Division. (Change of Place: From Kodigehalli Railway Level Crossing to TATA Nagara Main Road Balance), BBMP, Bangalore.
Reference	:	AEE/KSD/PR/ /2014-15 Dated: 01.12.2014
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	16.12.2014



The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	10.40	9.65	9 Kn (min)
2	Marshal flow, mm	2.25	3.50	2 - 4
3	Percent air voids in Mineral Aggregate	14.20	13.35	13 - 15
4	Voids in Compacted Mix	5.15	4.70	3 - 6
5	Percent Voids filled with Bitumen	68.90	69.45	65 - 75
6	Density, g/cc	2.27	2.26	--

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